



Office de la propriété
intellectuelle
du Canada

Un organisme
d'Industrie Canada

Canadian
Intellectual Property
Office

An Agency of
Industry Canada

Re PCT/PTO 11 JAN 2005 #2

PCT/CA 03/ 00966

29 JULY 2003 29.07.03

REC'D 05 SEP 2003

WIPO PCT

*Bureau canadien
des brevets
Certification*

*Canadian Patent
Office
Certification*

La présente atteste que les documents
ci-joints, dont la liste figure ci-dessous,
sont des copies authentiques des docu-
ments déposés au Bureau des brevets.

This is to certify that the documents
attached hereto and identified below are
true copies of the documents on file in
the Patent Office.

Specification and Drawing, as originally filed, with Application for Patent Serial No:
2,393,169, on July 12, 2002, by KIM SHALLCROSS, for "Killing Bacteria, Viruses,
Fungus, Parasites and Worms in Water and Food with a Rotating Magnet".

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

L. Régimbald
Agent certificateur/Certifying Officer

July 29, 2003

Date

Canada

(CIPO 68)
04-09-02

OPIC  CIPO

**KILLING BACTERIA, VIRUSES, FUNGUS, PARASITES AND
WORMS IN WATER AND FOOD WITH A ROTATING MAGNET**

Field of the Invention

The present invention relates to the field of purification of water and other substrates.

The present invention provides a method and apparatus for the purification of water and other substrates.

- 5 The present invention provides an apparatus to treat water, and other substrates, using a rotating series of magnets to kill bacteria and virus and the like in the water.

Background of the Invention

It is known to use a rotating magnet to "magnetize" water, for instance using a Watermag™. That product uses a rotating magnetic field to treat water to reduce scale,

- lower water viscosity, increase calcium solubility, and promote health.

Devices for magnetically treating water are also shown in U.S. Patent No. 5,816,058 (Lee et al.) and U.S. Patent No. 6,171,490 (Kim et al.). The Kim patent discloses a device configures like a blender with a bar magnet attached to the shaft of the blender motor. This unit provides minimal magnetic effect, and is not suitable for bulk water treatment. It does not, moreover, purport to eliminate viruses and bacteria by magnetic treatment.

- The Lee et al. device for Magnetically Treating Water has a magnet, and rotates water around it. It will be understood that this unit provides magnetic treatment, by exposing water to magnets spinning on the axial face of a shaft. It does not purport to purify the water being treated of virus and bacteria.

The present invention utilizes magnets to treat water differently from known magnetic water treatments, by utilizing a series of magnets, mounted on a rotating shaft. In a

preferred embodiment, the magnets are mounted on the shaft with their polar face radially outward relative to the axis of the shaft. In a more preferred embodiment, the shaft has a plurality, eg. six (but other numbers are possible) of faces with a row of similarly oriented magnets on each face. Most preferably, the magnets are neodymium-boron-iron magnets, mounted in linear rows on a shaft of an electric motor.

In a broad aspect, then, the present invention relates to a device for purifying water and other substrates from pathogens selected from the group consisting of bacteria, viruses, fungi, parasites, and worms, comprising: at least one magnet mounted for rotation on a shaft; and means to rotate said shaft.

In drawings that illustrate the present invention by way of example:

FIG. 1 is a schematic of an apparatus of a preferred embodiment of the present invention;

FIG. 2 is a detail view of the magnet holding shaft of the apparatus of FIG. 1.

Referring now to the drawings, the apparatus of the present invention a block 1 mounted coaxially on a shaft 2 coupled to an electric motor 3. It will be understood that electric motor 3 may be any other means to rotate the shaft 2, such as a hydraulic motor, as will be obvious to one skilled in the art.

Magnets 4, which are preferably neodymium magnets such as NE027 .750 (dia) x .500 (ht) 27 MGOe magnets, from Jobmaster Magnets, Inc. of Mississauga, Ontario, are mounted in rows on the faces of block 1. There may be from 2 to about 12 (or more) faces on block 1 which may be made from any material, such as aluminum. A practical number of faces is 6. The number of magnets in each row is any number from 1 to 20 or more, depending on the size of installation. A practical number is 6. The magnets in each face are preferably mounted with similar polarity, for maximum effect, but the

invention will function regardless of the orientation of the individual magnets. For maximum effect, three rows of magnets on one side of a six sided block 1 will have similar orientation, and the three rows on the opposite side will have opposite orientation.

The block is rotated by the motor at any speed, and it has been found that a rotational speed of about 1150 rpm will be effective.

Water, or other substrate, to be purified is passed close to the rotating magnet block 1, and it has been found that viruses and bacteria in the water or other substrate is eliminated. The substrate may be brought into proximity with the rotating magnetic field of the block in batches, eg. a litre or two at a time, or it may be flowed by in a pipe. It is necessary only that the substrate enter the rotating magnetic field. Residence time in the field is not required. Tests were conducted with the apparatus illustrated and described, as follows:

Example 1

Three samples of water containing:

- 1) E. coli (Generic) bacteria;
- 2) E. coli (MS2) bacteria;
- 3) Pseudomonas aeruginosa bacteria

were measured for bacterial concentration, 5 ml samples of each were then brought into proximity (about 10 cm) with the rotating block (1150 rpm) apparatus described above.

Results of bacterial concentration readings after treatment were as follows:

Table 1

Sample No.	Initial Concentration cfu/ml	Final Concentration cfu/ml
1	0.15	0.06
2	7.0×10^2	2.6
3	1.9	0.3

It will be observed, then, that treatment with the device of the present invention provides up to over 99% reduction of harmful bacteria. Moreover, it has been determined that the time needed for the bacteriocidal effect is only about 0.03 seconds.

It will be appreciated that numerous modifications and alterations of the present invention will be possible without departing from the spirit of the invention.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A device for purifying water and other substrates from pathogens selected from the group consisting of bacteria, viruses, fungi, parasites, and worms, comprising:
 - a) at least one magnet mounted for rotation on a shaft; and
 - b) means to rotate said shaft.
2. A device as claimed in claim 1, wherein a plurality of magnets are mounted on said shaft.
3. A device as claimed in claim 1 or 2, wherein said magnets are radially oriented relative to the axis of rotation of said shaft.
4. A device as claimed in claim 3, wherein said magnets are mounted in a block mounted on said shaft co-axially therewith.
5. A device as claimed in claim 4, wherein said magnets are mounted in rows on axial facets of said block.
6. A device as claimed in claim 5 wherein the magnets in each row are similarly north/south oriented.
7. A device as claimed in claim 5 or 6, including six said facets.
8. A device as claimed in any one of claims 1-6, wherein said magnets are neodymium magnets.
9. A device as claimed in claim 8, wherein said magnets are neodymium-boron-iron magnets.

10. A device as claimed in any one of claims 1-7, wherein said magnets are electromagnets.
11. A method of purifying water or any other substrate comprising bringing said water or other substrate into proximity with the device of any one of claims 1-10 while said shaft is rotating.

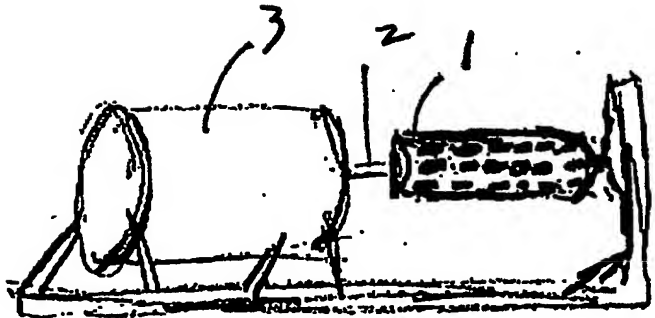


FIG. 1

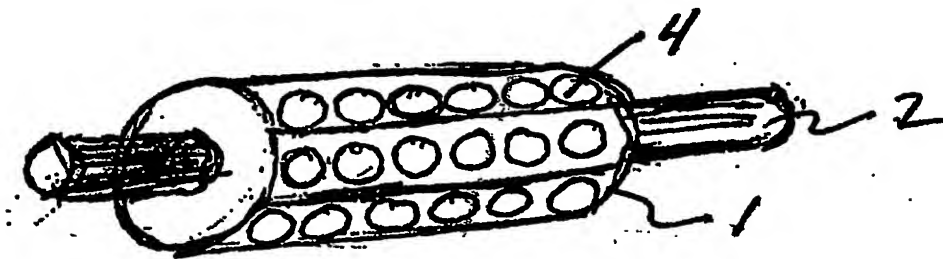


FIG. 2